A. Demand and Supply (18 pts)

1. Find the equation for demand (Qd=f(P)).

2. Find the equation for supply (Qs=f(P)).

3. Find equilibrium P and Q.

4. Find the area of "value" to consumers at equilibrium.

5. Find the cost of producing at equilibrium.

6. Find the producer surplus at equilibrium.

B. Ceiling/Floors (12 pts) Same Demand and Supply as A above, but now the government passes a law to keep the price below $4.

1. What is the quantity traded?

2. What is the producer surplus when this law is passed?

3. What is the change in consumer surplus caused by this price ceiling?

4. What is the deadweight cost caused by this price ceiling?

C. (15 pts) Comparative advantage. You are one of five people stuck on a deserted island with only two valuable things to do with your time: catch fish or gather coconuts. Here are the maximum daily capabilities of you and your companions:

- Alan: 5 Units of Coconuts, 8 Units of Fish
- Betty: 9 Units of Coconuts, 3 Units of Fish
- Carl: 5 Units of Coconuts, 5 Units of Fish
- Denise: 10 Units of Coconuts, 4 Units of Fish
- Edward: 2 Units of Coconuts, 3 Units of Fish

Who has the comparative advantage in gathering coconuts? What is his (or her) cost?

Draw a marginal opportunity cost curve (the supply curve) for coconuts. (all five survivors must be in this curve.)
3. If the survivors want 21 coconuts per day, what is the most fish we can get per day? In a table, show how many coconuts and how many fish each survivor will get to achieve this.

\[
\begin{array}{ccc}
23 & B & \frac{2}{3}(9) = 3 \\
-13.5 & D & \frac{1}{2}(10) = 5 \\
9.2 & C & \frac{1}{3}(2) = \frac{1}{9.2} \\
\end{array}
\]

4. What is the (minimum) cost of gathering 21 coconuts?

5. If the survivors want 10 fish per day, what is the most coconuts we can get per day? In a table, show how many coconuts and how many fish each survivor will get to achieve this.

D. Comparative Statics (5 pts)

In the diagram, draw a demand and supply curve. Then draw new curves and use arrows to show the direction of change for these curves. Then circle the best answer for each of the following four statements.

Consumers in our town sometimes eat apples and sometimes eat peaches. What happens to the market for peaches when the apple crop is very poor this year?

Demand will SHIFT RIGHT/SHIFT LEFT/NO SHIFT
Supply will SHIFT RIGHT/SHIFT LEFT/NO SHIFT
Equilibrium PRICE will RISE/FALL/UNCERTAIN CHANGE
Equilibrium QUANTITY will RISE/FALL/UNCERTAIN CHANGE
You MUST SHOW YOUR WORK clearly either in the margins or on an attached sheet of paper for complete credit.

A. Market Power (40 pts) The market for widgets is:

\[
P: \begin{cases} 20 & \text{for } P \geq 40 \\ 60 & \text{else} \end{cases}
\]

\[
Q_d: \begin{cases} 10 & \text{for } 10 \leq Q_d \leq 14 \\ 0 & \text{else} \end{cases}
\]

\[
Q_s: \begin{cases} 3 & \text{for } Q_s = 7 \\ 11 & \text{else} \end{cases}
\]

1. \( \frac{dQ_d}{dP} = 34 - \frac{1}{2}P \) What is the equation for the demand curve \((Q_d=f(P))\)?

2. \( \frac{dQ_s}{dP} = -1 + \frac{1}{2}P \) What is the equation for the supply curve \((Q_s=f(P))\)?

What is equilibrium \(P\) and \(Q\)?

3. \( P = 50, Q = 1 \)

\[
\frac{dQ_s}{dP} = \frac{Q}{2} = 20.5
\]

What are the producer surplus at equilibrium?

4. \( MR = 68 - 4Q \) What is the equation for the marginal revenue curve \((MR=f(Q))\)?

5. \( MC = 5 + 5Q \) What is the equation for the marginal cost curve \((MC=f(Q))\)?

6. \( P = 54 \) What is the \(Q\) that maximizes producer surplus?

7. \( P = 68 - 14 \) What is the \(P\) which maximizes producer surplus?

8. Draw a rough diagram, clearly showing equilibrium (\#3) and the \(P\) & \(Q\) for the monopoly (\#7 & \#8).

9. When \(P = 20\), we sell 10 units of output. When \(P = 19\), we only sell 11 units of output. What is the marginal revenue between 10 and 11 units of output?

\[
\Delta Q = 1, \quad \Delta T = 30 - 20
\]

\[
\frac{MR}{n} = \frac{\Delta T}{\Delta Q} = 9
\]

B. Short Answers (10 pts) From class and the textbook.

1. What is the definition of “predatory pricing”?

Predatory pricing is temporarily selling below cost in an effort to drive competitors out of a business. Once your competitors are gone (i.e. bankrupt), you hope to raise prices and earn a premium by price searching to earn enough to cover the losses of predatory pricing.

2. What is the deadweight loss caused by price searching?
You MUST SHOW YOUR WORK clearly either in the margins or on an attached sheet of paper for complete credit.

A. Market Power (40 pts)

1. The market for widgets is: P: 18 30 12 etc.,
   Qd: 14 -6 8 42 etc.,
   Qs: 2 +2 4 6 etc.,
   What is the equation for the demand curve (Qd=f(P))?

2. What is the equation for the supply curve (Qs=f(P))?

3. What is equilibrium P and Q?

4. What are the producer surplus at equilibrium?

5. What is the equation for the marginal revenue curve (MR=f(Q))?

6. What is the equation for the marginal cost curve (MC=f(Q))?

7. What is the equation for the demand curve (Qd=f(P))?

8. What is the equation for the supply curve (Qs=f(P))?

9. What is the marginal revenue for the monopoly (#7 & #8).

10. What is the marginal cost for the monopoly?

11. What is the change in producer surplus caused by the monopoly?

12. What is the change in producer surplus caused by the monopoly/price searching?

13. What is the change in producer surplus caused by the monopoly/price searching?

B. Short Answers (10 pts)

1. When P=30, we sell 10 units of output. When P=28, we only sell 11 units of output. What is the marginal revenue between 10 and 11 units of output?

   \[ \Delta Q = +1 \]
   \[ \Delta P = -2 \]
   \[ TR = 30(10) = 300 \]
   \[ TR = 28(11) = 308 \]
   \[ MR = 50 - 42 = 8 \]

2. What is the definition of "predatory pricing"?
You MUST show work clearly for the calculation problems.

1. (8 pts) Choose C, I, G, X, M or N (for none of the above) to show how the following transactions will be recorded in Canada’s GDP. Some transactions may require more than one answer.

A. _______ A Japanese company buys a chain of Canadian movie theatres.

B. _______ The Japanese company spends $1 million to improve the seating in the Canadian movie theatres (that they just purchased).

C. _______ To improve sales, the Japanese company hires lots of new workers to improve service (reduce line-ups) in their new Canadian movie theatres.

D. _______ The government of Canada hires some economists to write a report about whether the Japanese-owned theatre chain in Canada will help or hurt our economy.

2. (24 pts) Our economy produces only three final goods. Use 2015 as the base year.

<table>
<thead>
<tr>
<th>YEAR</th>
<th>Good A Quantity</th>
<th>Price</th>
<th>Good B Quantity</th>
<th>Price</th>
<th>Good C Quantity</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>8</td>
<td>4</td>
<td>5</td>
<td>7</td>
<td>5</td>
<td>20</td>
</tr>
<tr>
<td>2014</td>
<td>10</td>
<td>3</td>
<td>2</td>
<td>8</td>
<td>7</td>
<td>15</td>
</tr>
<tr>
<td>2015</td>
<td>12</td>
<td>2</td>
<td>3</td>
<td>9</td>
<td>7</td>
<td>18</td>
</tr>
<tr>
<td>2016</td>
<td>10</td>
<td>6</td>
<td>4</td>
<td>6</td>
<td>6</td>
<td>19</td>
</tr>
</tbody>
</table>

A. Calculate the nominal GDP and the nominal growth rate for each of the above four years.

B. Calculate the real GDP and the real growth rate for each of the above four years.

C. Calculate the GDP deflator and the inflation rate for each of the above four years.

D. Calculate the CPI and the inflation rate for each of the above four years.

E. Which year had the highest increase in the standard of living? What number did you use to determine this?

F. Which year had the highest price level? What number did you use to determine this?

* (4 pts) Compounding: In 2016, India’s GDP per capita was $1,723. If India’s per capita GDP grows at 7.5% per year over the next 20 years, what will India’s GDP per capita be in 2036?

\[ 1723 \times (1.075)^{20} = \$6071.24 \]

* (6 pts) Suppose the deflator increased by 3.4% while the GDP in today’s dollars rose from $967.8 to $1002.4. What was the real growth rate?

\[ \frac{1002.4}{967.8} = 1.035 > 1.034 = 1.002 \quad \text{growth rate} = 0.2\% \]

* (8 pts) Suppose the population of our country is 65.4 million and 32.4 million are employed. The participation rate is 64.8%, the unemployment rate is 8.5%.

\[ \frac{35.4 - 32.4}{32.4} = 3.0\% \quad \text{How many people are unemployed?} \]

\[ \frac{54.6 - 35.4}{35.4} = 19.2\% \quad \text{How many people are not participants?} \]
You MUST show your work clearly for full credit.

1. (10 pts) \( \frac{Y_{AD}}{Y_{AS}} \) --- Let \( Y_{AD} = 540 + 4(G-T) + 5(Ms) - 6P \), \( Y_{AS} = 400 + 8P \), \( G = 200 \), \( I = 160 \), \( Ms = 80 \) and \( Yf = 840 \)

2. a. \( p = 50, Y = 800 \) What is equilibrium \( p \) and \( Y \)?

3. b. Is this economy in a bubble or in a recession? Explain. \( Y_f > Y_e \)

4. Draw a “Phillips curve” and show CLEARLY where this economy is on that Phillips curve. Is inflation high or low? Is unemployment high or low?

5. a. The government wants to use “fiscal policy” to get to full employment. If only fiscal policy is used, what is the “deficit” going to be at full employment? \( 540 + 4(19.5) - 6(50) \)

6. b. Instead, the government wants to use “monetary policy” to get to full employment. If only monetary policy is used, what is the \( \% \Delta M \) necessary to get to full employment? \( 540 + 4(19.5) - 5(15) - 330 \)

7. (4 pts) Deficits and Debts -- In 2016, tax revenue is \( $4000 \), Non-interest spending is \( $3500 \) and the current interest rate on debt is 10%. At the beginning of 2016, government debt is \( $7000 \).

8. a. \( -7200 \) What will the debt be at the end of 2016?

9. b. \( -90 \) If tax revenue increases by 5% and non-interest spending rises by 2%, what will the deficit be in 2017 (the next year) if interest rates don’t change?

10. Interest rates and Present Value (4 pts)

11. a. B by $68.62 If the interest rate is 10% should you pay A. ($1000 today) for a used car or B. ($1500 in five years) Which is better (A or B)? By how much?

12. b. $1049.737.04 What is the present value of a three year, $1 million bond with a coupon rate of 12% when today’s interest rate is 10%?

13. Money (4 pts) In our country, consumer own $800 worth of shares in companies and $450 worth of bonds. Banks have $1200 of cash inside their vaults. Businesses have $600 of cash in their cash registers, checking accounts of $1350 and savings accounts of $400. Consumers have deposits in near banks (credit unions, etc.) of $900. They have credit card balances outstanding of $2000. Consumers have $500 in their checking accounts and $850 in their savings accounts. They also have $200 of cash in their pockets and at home as well as $300 worth of gold.

14. a. 2650 How much M1 is in this economy?

15. b. 3500 How much M2 is in this economy?

16. Open market operations. (9 pts) The demand for loanable funds is 100-50r and the supply is 82+250r (Q in billions).

17. a. \( 6^\% \) What is the current interest rate?

18. b. \( 985.538.36 \) What is the price of a three month, $1 million T-bill?
b. The central bank thinks the interest rate should be 4%.

\[
\frac{\text{reserve bid price}}{1.04} = 970, \quad 24.274
\]

What will be the "reserve bid price" of a three month $1 million T-bill?

Will the central bank be printing money or "eating" money?

How many dollars worth of T-bills with the central bank buy or sell?

6. (14 pts) Comparative Advantage

In one day the workers on island A can gather up to 30 coconuts or 60 fish. (Assume constant opportunity costs). On island B, workers can gather 15 coconuts or 3 fish. Assume people like to have equal numbers of coconuts and fish.

\[ F = C = 2.6 \]

Before trade, how many coconuts and fish are gathered on island A?

\[ C = 30 - \frac{16}{20} F = 30 \]

Before trade, how many coconuts and fish are gathered on island B?

\[ C = 15 - \frac{5}{15} F = 15 - \frac{6}{15} F \]

a. \( C = 15, \quad F = 30 \)

b. \( C = 15, \quad F = 30 \)

c. Draw a world production possibility curve (Coconuts on the Y-axis)

\[ C = 45 - \frac{3}{2} F = F \]

\[ 45 - \frac{3}{2} F \]

\[ F = C = 30 \]

d. \( C = 15, \quad F = 30 \)

If people on the two islands are going to trade with each other, how many coconuts and fish will be gathered on island A?

\[ (15 + 30)/2 = 22.5 \]

(Export 7.5 C, import 7.5 F)

\[ (5 + 0)/2 = 7.5 \]

(Export 7.5 F, import 7.5 C)

After trade, how many coconuts and fish will be consumed on island A?

\[ C = 7.5 \]

After trade, how many coconuts and fish will be consumed on island B?

7. (5 pts) Let the international market for Canadian dollars be: \( Q_d = 500 - 200e, \quad Q_s = 230 + 100e \) (e is US $ per Can $)

a. \( .9 \)

What is equilibrium e?

b. \( \text{buying} \)

The central bank wants the e to be .80(US$ per C$). Will the Bank of Canada be buying or selling foreign reserves?

c. \( .310 - .310 = .010 \)

How many dollars worth of foreign reserves will the Bank of Canada be buying or selling?